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Teachers' Beliefs and Educational Research: Cleaning Up a Messy Construct

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Attention to the beliefs of teachers and teacher candidates should be a focus of educational research and can inform educational practice in ways that prevailing research agendas have not and cannot. The difficulty in studying teachers' beliefs has been caused by definitional problems, poor conceptualizations, and differing understandings of beliefs and belief structures. This article examines the meaning prominent researchers give to beliefs and how this meaning differs from that of knowledge, provides a definition of belief consistent with the best work in this area, explores the nature of belief structures as outlined by key researchers, and offers a synthesis of findings about the nature of beliefs. The article argues that teachers' beliefs can and should become an important focus of educational inquiry but that this will require clear conceptualizations, careful examination of key assumptions, consistent understandings and adherence to precise meanings, and proper assessment and investigation of specific belief constructs. Implications of findings and directions for future research are offered.

Perhaps the most important single cause of a person's success or failure educationally has to do with the question of what he believes about himself.

—Arthur Combs

Although research on teacher thinking is abundant and thriving (see Clark & Peterson's review, 1986), critics have questioned how its findings can be of use to teachers or teacher education. They suggest that another perspective is required from which to better understand teacher behaviors, a perspective focusing on the things and ways that teachers believe (e.g., Clark, 1988; Cole, 1989; Fenstermacher, 1979, 1986; Nespor, 1987; Pintrich, 1990). This view is based on the assumption that beliefs are the best indicators of the decisions individuals make throughout their lives (Bandura, 1986; Dewey, 1933; Nisbett & Ross, 1980; Rokeach, 1968), an assumption that can be traced to human beings' earliest philosophical contemplations.

Few would argue that the beliefs teachers hold influence their perceptions and judgments, which, in turn, affect their behavior in the classroom, or that understanding the belief structures of teachers and teacher candidates is essential to improving their professional preparation and teaching practices (Ashton, 1990; Ashton & Webb, 1986; Brookhart & Freeman, 1992; Buchmann, 1984; Clark, 1988; Dinham & Stritter, 1986; Feiman-Nemser & Floden, 1986; Fenstermacher, 1979, 1986; Goodman, 1988; Munby, 1982, 1984; Nespor, 1987; Tabachnick, Popkewitz, & Zeichner, 1979; Weinstein, 1988, 1989; Wilson, 1990).

More than 10 years ago, Fenstermacher (1979) predicted that the study of beliefs would become the focus for teacher effectiveness research. More recently, Pintrich

(1990) suggested that beliefs ultimately will prove the most valuable psychological construct to teacher education. Nevertheless, the implicit interest and fascination that educators and researchers have in beliefs have not become explicit, either in educational practice or in research endeavors, and studies aimed at understanding the beliefs of teachers have been scarce (Clark & Peterson, 1986). Nespor (1987) argued that

in spite of arguments that people's "beliefs" are important influences on the ways they conceptualize tasks and learn from experience . . . little attention has been accorded to the structure and functions of teachers' beliefs about their roles, their students, the subject matter areas they teach, and the schools they work in. (p. 317)

That researchers should find themselves pleading for attention to teachers' beliefs is itself an indication of the direction educational psychology has taken and of the issues with which it has chosen to concern itself, but it is not surprising that researchers have avoided so formidable a concept. As a global construct, belief does not lend itself easily to empirical investigation. Many see it so steeped in mystery that it can never be clearly defined or made a useful subject of research. For these reasons, it is often seen as the more proper concern of philosophy or, in its more spiritual aspects, religion.

But beliefs are a subject of legitimate inquiry in fields as diverse as medicine, law, anthropology, sociology, political science, and business, as well as psychology, where attitudes and values have long been a focus of social and personality research. And researchers have learned enough about specific types of beliefs to make their exploration feasible and useful to education. Self-efficacy, for example, is a cornerstone of social cognitive theory. Self-concept and self-esteem are the essence of phenomenological and humanistic theories. Studies on attribution beliefs and locus of control are also prominent in investigations of student thought processes, and interest in epistemological beliefs is growing. Subject specific beliefs, such as beliefs about reading, mathematics, or the nature of science, are key to researchers' attempting to understand the intricacies of how children learn. The information processing approach focuses on the characteristics of learners, including not only self-beliefs, such as self-concept and self-efficacy, but also beliefs about the nature of intelligence, of knowledge, and of motivation.

Clearly, when specific beliefs are carefully operationalized, appropriate methodology chosen, and design thoughtfully constructed, their study becomes viable and rewarding. It will not be possible for researchers to come to grips with teachers' beliefs, however, without first deciding what they wish *belief* to mean and how this meaning will differ from that of similar constructs. It will also be necessary for them to specify what they know about the nature of beliefs and belief systems, so that research may be informed by the assumptions this understanding will create.

Toward a Meaning of Belief

In the world of human thought . . . the most fruitful concepts are those to which it is impossible to attach a well-defined meaning.

—Hunter Lewis, *A Question of Values*

All words begin as servants, eager to oblige and assume whatever function may be assigned them, but, that accomplished, they become masters, imposing the will of their predefined intention and dominating the essence of human discourse. It is for

this reason that articulate conversation must demand not only clarity of thought and expression but also preciseness of word choice and meaning. Educational psychology does not always accord its constructs such precision, and so defining beliefs is at best a game of player's choice. They travel in disguise and often under alias—attitudes, values, judgments, axioms, opinions, ideology, perceptions, conceptions, conceptual systems, preconceptions, dispositions, implicit theories, explicit theories, personal theories, internal mental processes, action strategies, rules of practice, practical principles, perspectives, repertoires of understanding, and social strategy, to name but a few that can be found in the literature.

The confusion, however, generally centers on the distinction between beliefs and knowledge, a distinction that Clandinin and Connelly (1987) attempted to clarify when they examined the origins, uses, and meanings of *personal knowledge constructs* used in studies of teachers' beliefs. They discovered a "bewildering array of terms" (p. 487)—including, teachers' teaching criteria, principles of practice, personal construct/theories/epistemologies, beliefs, perspectives, teachers' conceptions, personal knowledge, practical knowledge—in addition to their own term, *personal practical knowledge*, which they defined as experiential knowledge "embodied and reconstructed out of the narrative of a teacher's life" (p. 490). In all cases, it was difficult to pinpoint where knowledge ended and belief began, and the authors suggested that most of the constructs were simply different words meaning the same thing.

Beliefs and Knowledge

Distinguishing knowledge from belief is a daunting undertaking. Nespor (1987), drawing from Abelson's (1979) similar efforts with artificial intelligence systems, identified four features characteristic of beliefs—existential presumption, alternativity, affective and evaluative loading, and episodic structure. Existential presumptions are the incontrovertible, personal truths everyone holds. Rokeach (1968) suggested that they are the taken-for-granted beliefs about physical and social reality and self and that to question them is to question one's own sanity. As such, they are deeply personal, rather than universal, and unaffected by persuasion. They can be formed by chance, an intense experience, or a succession of events, and they include beliefs about what oneself and others are like. For example, a teacher may believe that students who fail are simply lazy; another teacher may believe that learning math is a function of drilling. Existential presumptions are perceived as immutable entities that exist beyond individual control or knowledge. People believe them because, like Mount Everest, they are there.

Sometimes individuals, for varying reasons, attempt to create an ideal, or alternative, situation that may differ from reality. Nespor (1987) explained how Ms. Skylark, due to traumatic experiences as a student, attempted to create the ideal teaching environment she had fantasized about as a child. Because her fantasies were carried out with teaching practices inconsistent with effective classroom procedures, they resulted in unfinished lessons and frequent interruptions.

Nespor (1987) suggested that beliefs have stronger affective and evaluative components than knowledge and that affect typically operates independently of the cognition associated with knowledge. Knowledge of a domain differs from feelings about a domain, a distinction similar to that between self-concept and self-esteem, between knowledge of self and feelings of self-worth. Teachers often teach the content of a

course according to the values held of the content itself. As with self-efficacy beliefs (Bandura, 1986), this combination of affect and evaluation can determine the energy that teachers will expend on an activity and how they will expend it.

Other theorists have based the distinction on the evaluative nature of belief. Nisbett and Ross (1980) conceptualized generic knowledge as a structure composed of a cognitive component, schematically organized, and a belief component, possessing elements of evaluation and judgment. For example, a teacher's knowledge of what typically happens in a school or his understanding of the faculty handbook are instances of cognitive knowledge. "Knowing" that Jim is a troublemaker or that boys are better at mathematics than girls are examples of a second kind of knowledge, belief. As such, belief is viewed as knowledge of a sort. All human perception is influenced by the totality of this generic knowledge structure—schemata, constructs, information, beliefs—but the structure itself is an unreliable guide to the nature of reality because beliefs influence how individuals characterize phenomena, make sense of the world, and estimate covariation. They influence even cognitive knowledge—Mrs. Brown's understanding of the faculty handbook may be influenced by her belief that Principal Smith is a weak and ineffectual man who fails to follow up when specific guidelines are not followed. Ernest (1989) suggested that knowledge is the cognitive outcome of thought and belief the affective outcome, but he acknowledged that beliefs also possess a slender but significant cognitive component.

What may be missing from these conceptualizations is the element that cognitive knowledge, however envisioned, must also have its own affective and evaluative component. The conception of knowledge as somehow purer than belief and closer to the truth or falsity of a thing requires a mechanistic outlook not easily digested. What truth, what knowledge, can exist in the absence of judgment or evaluation? But, sifting cognition from affect, and vice versa, seems destined to this sort of fence straddling.

Nespor (1987) further contended that knowledge system information is semantically stored, whereas beliefs reside in episodic memory with material drawn from experience or cultural sources of knowledge transmission—what some have called *folklore* (see Buchmann & Schwille, 1983). Nespor argued that beliefs drew their power from previous episodes or events that colored the comprehension of subsequent events. Such episodes played key roles in the practices of his study's teachers—Ms. Skylark's efforts to create a friendly classroom environment were rooted in her vivid childhood memories, and Mr. Ralston based his math methods on memories of the teaching techniques he used while in the Job Corps.

Other researchers have noted this episodic nature of beliefs. Goodman (1988) discovered that teachers were influenced by *guiding images* from past events that created *intuitive screens* through which new information was filtered. Calderhead and Robson (1991) reported that preservice teachers held vivid images of teaching from their experiences as students, images that influenced interpretations of particular courses and classroom practices and played a powerful role in determining how they translated and utilized the knowledge they possessed and how they determined the practices they would later undertake as teachers. Eraut (1985) wrote that unsystematic personal experience, taking the form of photographic images residing in long term memory, played a key role in the process of creating and recreating knowledge.

The importance of critical episodes and images helps explain how teachers develop their educational belief structure as children, a matter of considerable importance to

teacher preparation that I will discuss later. Nespor (1987) found it likely that a “crucial experience or some particularly influential teacher produces a richly-detailed episodic memory which later serves the student as an inspiration and a template for his or her own teaching practices” (p. 320). Such memories can be from past teachers, literature, or even the media. Preservice teachers often reveal such memories and influences in interviews and class discussions (Calderhead & Robson, 1991; Eraut, 1985; Goodman, 1988).

Nespor (1987) also argued that belief systems, unlike knowledge systems, do not require general or group consensus regarding the validity and appropriateness of their beliefs. Individual beliefs do not even require internal consistency within the belief system. This nonconsensuality implies that belief systems are by their very nature disputable, more inflexible, and less dynamic than knowledge systems. One likes to think that reason and evidence advance knowledge and that informed scholarship develops; beliefs are basically unchanging, and, when they change, it is not argument or reason that alters them but rather a “conversion or gestalt shift” (p. 321). Knowledge systems are open to evaluation and critical examination; beliefs are not. Nespor added that belief systems are also unbounded in that their relevance to reality defies logic, whereas knowledge systems are better defined and receptive to reason. And yet, for all their idiosyncrasies, he concluded that beliefs are far more influential than knowledge in determining how individuals organize and define tasks and problems and are stronger predictors of behavior.

The Effect of Knowledge Versus Beliefs

The difference between the constructs, even if they are in degree and not kind, will, of course, depend on how researchers choose to operationalize them, and I will argue later that research studies would be well served by a reasoned choice commonly understood and consistently employed. Also of importance, however, is understanding the nature of the relationship between knowledge or beliefs on the one hand and teacher behavior and student outcomes on the other, as well as of that between belief and knowledge themselves.

Ernest (1989) explored the effects of teachers’ knowledge of mathematics and concluded that two teachers may have similar knowledge but teach in different ways. He suggested that the powerful effect of beliefs is more useful in understanding and predicting how teachers make decisions. Brown and Cooney (1982) studied mathematics interns and noted a washout rate inherent in their knowledge. That is, knowledge learned was often not used. They concluded that examining the interns’ beliefs about mathematics was in order. Interpretations from these and similar studies, however, are always risky, for, as I noted earlier, inconsistency of meaning is the order of the day.

The nature of teaching and the teacher’s work is often so ill defined that educational beliefs are particularly vulnerable to becoming what Nespor (1987) called an *entangled domain*. Such domains hold entities that do not share important criteria with other entities in the same domain. Their thematic features only partially overlap, and their connections are incomplete and unclear. When a teacher encounters an entangled domain, cognitive and information-processing strategies do not work, appropriate schemata are disconnected and unavailable, and the teacher is uncertain of what information is needed or what behavior is appropriate. It is the episodic core of beliefs that makes their use so likely in just such a circumstance. Unable to use more

appropriate knowledge structures and cognitive strategies in these situations, the teacher uses beliefs and belief structures, with all their problems and inconsistencies. This mode of functioning is especially unsuitable in a profession characterized by what Marshall McLuhan called *hot action*, where teachers may have as many as 1,000 interpersonal contacts daily and often must function on impulse and intuition rather than reflection (Eraut, 1985; Jackson, 1968; Lortie, 1975).

Not all researchers agree that beliefs offer greater insight into human behavior than knowledge. Roehler, Duffy, Herrmann, Conley, and Johnson (1988) reasoned that, because knowledge structures focus on the cognitive aspects of teaching, because these structures get "at the heart of the 'thought' in the 'thought-to-practice'" (p. 164), and because their evolving nature is a more accurate reflection of the present understanding of the "fluid nature of teacher thought in action" (p. 164), knowledge must take priority over affect, in the form of beliefs, although they acknowledged that beliefs certainly influence teacher thinking. Beliefs, they argued, are static and represent eternal truths that remain unchanged in a teacher's mind regardless of the situation. Knowledge, however, is fluid and evolves as new experiences are interpreted and integrated into existing schemata. Beliefs also foster schools of thought, whereas knowledge is unique to the individual, and beliefs are surrounded by an emotional aura that dictates rightness and wrongness, whereas knowledge is emotionally neutral (the reader may wish, at this point, to pause and consider the notion of emotionally neutral knowledge). They concluded that beliefs influence what teachers say outside the classroom, but their behavior in the classroom is a result of beliefs (and here is a twist) being filtered by experience. Knowledge, on the other hand, represents efforts to make sense of experience, and thus knowledge, not belief, ultimately influences teacher thought and decision making.

Anderson (1983, 1985) categorized knowledge as declarative or procedural, as knowledge *what* and knowledge *how* (see Greeno, 1978; Ryle, 1949). Declarative knowledge is the knowledge of what, such as knowing the time of day or the principal exports of Peru. Procedural knowledge is the knowledge of how things or systems work. A person may know what time it is but be oblivious to the intricacies of a clock's inner workings, much less be able to put one together. Likewise, a teacher may have knowledge of geometry but have no idea how to put her students in possession of it. Paris, Lipson, and Wixson (1983) introduced a third type of knowledge, conditional knowledge, that involves understanding when, why, and under what conditions declarative or procedural knowledge should be used. A teacher may know classroom management procedures and how to execute them but be uncertain as to when or under what conditions a particular one is appropriate. Calderhead and Robson (1991) noted that preservice teachers use episodic images as recipes but do not have the knowledge to question or modify them before or during the task at hand.

It is not difficult to see that beliefs underlie these knowledge categories. Declarative knowledge requires belief in the authority of its source, in one's logic, or in one's own senses. Individuals know it is noon because they believe the time piece that says so, in those who taught them to tell time, and in the logical and scientific concept of time as they know (believe) it. They also believe that what they read about Peru in their geography text must be correct. To see how beliefs are involved in procedural knowledge, imagine how teachers may handle a disciplinary problem with a difficult student. They may begin by evaluating the nature of the problem and the nature of the student involved. As they attempt to determine what management technique will

be most effective and appropriate, they engage in a series of judgments in which they will continually evaluate people, context, and situation.

Lewis (1990) argued that the origin of all knowledge is rooted in belief, that ways of knowing are basically ways of choosing values. Even when learning is due to personal discovery or insight, for example, individuals begin by believing their own senses, their intuition, the laws of nature, logic. One need not delve into religion, politics, or personal ideology to understand that there is no escaping the intertwined nature of knowledge and belief. But is knowledge the same as belief? And is the distinction a valid and necessary one? Lewis insisted that the two constructs are synonymous, that the most simple, empirical, and observable thing one knows will, on reflection, reveal itself as an evaluative judgment, a belief. But acquiring knowledge and choosing, developing, and maintaining beliefs may not involve the same cognitive processes, at least not in the same ways. Pintrich (1990) prudently argued that, regardless of conceptualizations, research has shown that both “knowledge and beliefs . . . influence a wide variety of cognitive processes including memory, comprehension, deduction and induction, problem representation, and problem solution” (p. 836).

Defining Beliefs

How then to best define beliefs, and to what aim? Eisenhart, Shrum, Harding, and Cuthbert (1988) suggested that the difficulty in defining beliefs and belief systems and the inconsistency of the definitions in vogue may be explained by the agendas of researchers and studies. That beliefs are studied in diverse fields has resulted in a variety of meanings, and the educational research community has been unable to adopt a specific working definition. For reasons I earlier explained, beliefs are seldom clearly defined in studies or used explicitly as a conceptual tool, but the chosen and perhaps artificial distinction between belief and knowledge is common to most definitions: Belief is based on evaluation and judgment; knowledge is based on objective fact.

Abelson (1979) defined beliefs in terms of people manipulating knowledge for a particular purpose or under a necessary circumstance. Brown and Cooney (1982) explained that beliefs are dispositions to action and major determinants of behavior, although the dispositions are time and context specific—qualities that have important implications for research and measurement. Sigel (1985) defined beliefs as “mental constructions of experience—often condensed and integrated into schemata or concepts” (p. 351) that are held to be true and that guide behavior. Harvey (1986) defined belief as an individual’s representation of reality that has enough validity, truth, or credibility to guide thought and behavior. Nisbett and Ross (1980) wrote of beliefs as “reasonably explicit ‘propositions’ about the characteristics of objects and object classes” (p. 28).

Dewey (1933) described belief as the third meaning of thought, “something beyond itself by which its value is tested; it makes an assertion about some matter of fact or some principle or law” (p. 6). He added that the importance of belief is crucial, for “it covers all the matters of which we have no sure knowledge and yet which we are sufficiently confident of to act upon and also the matters that we now accept as certainly true, as knowledge, but which nevertheless may be questioned in the future” (p. 6). Conceptualizing it thus, might not Descartes have concluded that we are, not so much because we think, but because we believe (or perhaps reflect)?

Rokeach (1968) defined beliefs, circularly, as “any simple proposition, conscious or unconscious, inferred from what a person says or does, capable of being preceded by the phrase, ‘I believe that . . . ’” (p. 113). Beliefs may be descriptive (It is time for mathematics class), evaluative (I do not enjoy teaching mathematics), or prescriptive (I must go in before the bell rings, or my students will have eaten my desk), but elements of each are present in most beliefs.

Rokeach (1968) argued that all beliefs have a cognitive component representing knowledge, an affective component capable of arousing emotion, and a behavioral component activated when action is required. Note the shift in emphasis from Nisbett and Ross’s (1980) description of generic knowledge. Where these cognitive researchers subsume belief as a type of knowledge, Rokeach subsumes knowledge as a component of belief. The difference may be merely academic, but it is conceptually revealing. When clusters of beliefs are organized around an object or situation and predisposed to action, this holistic organization becomes an attitude. Beliefs may also become values, which house the evaluative, comparative, and judgmental functions of beliefs and replace predisposition with an imperative to action. Beliefs, attitudes, and values form an individual’s belief system.

Understanding beliefs, Rokeach cautioned, requires making inferences about individuals’ underlying states, inferences fraught with difficulty because individuals are often unable or unwilling, for many reasons, to accurately represent their beliefs. For this reason, beliefs cannot be directly observed or measured but must be inferred from what people say, intend, and do—fundamental prerequisites that educational researchers have seldom followed.

Varying Meanings of Teachers’ Beliefs

All teachers hold beliefs, however defined and labeled, about their work, their students, their subject matter, and their roles and responsibilities, but a variety of conceptions of educational beliefs has appeared in the literature. For example, Clark (1988) called teachers’ beliefs preconceptions and implicit theories. He noted that their use is not at all consistent with what one might find in textbooks or professors’ lecture notes, for they “tend to be eclectic aggregations of cause-effect propositions from many sources, rules of thumb, generalizations drawn from personal experience, beliefs, values, biases, and prejudices” (p. 5). Porter and Freeman (1986) defined orientations to teaching as including teachers’ beliefs about students and the learning process, about the role of schools in society, and about teachers themselves, the curriculum, and pedagogy. These predispositions and beliefs also included questions about the purpose of schooling, about teacher responsibility for achieving their goals, and about beliefs that students are capable of achieving these goals.

Tabachnick and Zeichner (1984) differentiated between teachers’ beliefs, as the construct had been used by early researchers, and *teacher perspectives*, a term earlier used by Janesick (1977) and defined as “a reflective, socially defined interpretation of experience that serves as a basis for subsequent action . . . a combination of beliefs, intentions, interpretations, and behavior that interact continually” (Clark & Peterson, 1986, p. 287). These perspectives are situation specific and action oriented. Unlike beliefs or attitudes, which Tabachnick and Zeichner (1984) perceived as little more than opinions with a disposition to act, perspectives include both the beliefs teachers have about their work (goals, purposes, conceptions of children, curriculum) and “the ways in which they [give] meaning to these beliefs by their behavior in

the classroom” (p. 28). Tabachnick and Zeichner chose the term *teacher perspectives* because most research connected with teachers’ beliefs had focused on what Sharp and Green (1975) called teaching ideology, “a connected set of systematically related beliefs and ideas about what are felt to be the essential features of teaching . . . a broad definition of the task and a set of prescriptions for performing it, all held at a relatively high level of abstraction” (p. 29). They considered the abstractness and lack of action inherent in ideology too vague for proper research and preferred the more situation-specific and action-oriented perspective.

Goodman (1988) also preferred the term *teacher perspectives*, noting that two students may express similar beliefs about teaching and education but the image associated with the verbal expressions of their beliefs may differ considerably. He observed that teaching strategies chosen by students reflected interpretations each gave to these guiding images. It is not so much the orientation to action but the interpretation of the belief that defines Goodman’s perspective, and it is the latter that guides behavior, although it is not altogether easy to appreciate how an interpretation of belief differs from belief itself. Ironically, these views of belief constructs as inferences of what individuals say, intend, and do are perfectly consistent with Rokeach’s (1960, 1968) earlier definitions of beliefs, attitudes, and values: new jargon, old meaning.

Toward Consensus

Definitions are basically conventions, general agreements among researchers that a particular term will represent a specific concept. The distinction ultimately made between belief and knowledge will be a reflection of these agreements and of the paradigmatic assumptions they represent rather than of any basic and incontrovertible truth inherent in the constructs. A community of scholars engaged in the research of common areas with common themes, however, has a responsibility to communicate ideas and results as clearly as possible using common terms. For these reasons, it is important to use the terms consistently, accurately, and appropriately once their definitions have been agreed on.

It is unavoidable that, for purposes of investigation, beliefs must be inferred. Rokeach (1968) suggested that this inference must take into account the ways that individuals give evidence of belief: belief statements, intentionality to behave in a predisposed manner, and behavior related to the belief in question. Tabachnick and Zeichner (1984) incorporated an action component into their definition of perspectives; Goodman’s (1988) conception of a guiding image is ultimately assessed through a teacher’s intentionality and responses to dilemmas. Research on beliefs is unlikely to be satisfying or informative unless belief inferences and assessments involve each in the investigation.

All broad psychological constructs at some point must come before the reductionist, multidimensional, or hierarchical chopping block to better suit the needs and requirements of research. Self-concept becomes academic, social, emotional; intelligence is fluid or crystallized. One may choose the model of knowledge structures that one prefers. Bandura (1986) suggested that even self-efficacy, a belief sub-construct, is too broad, vague, and context free to be useful, arguing that self-beliefs must be context specific and relevant to the behavior under investigation to be useful to researchers and appropriate for empirical study. Human beings, after all, have beliefs about everything. Conceptualizing a belief system involves the understanding

that this system is composed of beliefs connected to one another and to other cognitive/affective structures, complex and intricate though these connections may be, that form *beliefs about* constructs—beliefs about politics, about abortion, about art, about the nature of knowledge. Rokeach (1968) called these attitudes.

Teachers' attitudes about education—about schooling, teaching, learning, and students—have generally been referred to as teachers' beliefs. As it is clear that not only teachers have these beliefs, however, the label is inappropriate. Also, teachers have beliefs about matters beyond their profession, and, though these certainly influence their practice, they should not be confused with the beliefs they hold that are more specific to the educational process. When researchers speak of teachers' beliefs, however, they seldom refer to the teachers' broader, general belief system, of which educational beliefs are but a part, but to teachers' educational beliefs. It is important to make the distinction.

The construct of educational beliefs is itself broad and encompassing. For purposes of research, it is diffuse and ungainly, too difficult to operationalize, too context free. Therefore, as with more general beliefs, *educational beliefs about* are required—beliefs about confidence to affect students' performance (teacher efficacy), about the nature of knowledge (epistemological beliefs), about causes of teachers' or students' performance (attributions, locus of control, motivation, writing apprehension, math anxiety), about perceptions of self and feelings of self-worth (self-concept, self-esteem), about confidence to perform specific tasks (self-efficacy). There are also educational beliefs about specific subjects or disciplines (reading instruction, the nature of reading, whole language).

The result is a view of belief that speaks to an individual's judgment of the truth or falsity of a proposition, a judgment that can only be inferred from a collective understanding of what human beings say, intend, and do. The challenge is to assess each component so as to have confidence that the belief inferred is a reasonably accurate representation of that judgment. Having presumed to dictate how beliefs might best be defined and conceptualized, I now explore the nature of the elusive construct and attempt to identify key research findings that provide assumptions useful to future research efforts.

On the Nature of Beliefs

"There is mystery here," wrote M. Scott Peck in the foreword to Hunter Lewis's (1990) *A Question of Values*, "but there is also some clarity" (p. ix). Peck was referring to the nature and sources of human motivation, values, and beliefs. Theorists generally agree that beliefs are created through a process of enculturation and social construction. Van Fleet (1979), drawing from Melville Herskovits's *Cultural Anthropology* and *Man and His Works*, wrote that this cultural transmission has three components: enculturation, education, and schooling. Enculturation involves the incidental learning process individuals undergo throughout their lives and includes their assimilation, through individual observation, participation, and imitation, of all the cultural elements present in their personal world. Education is the directed and purposeful learning, either formal or informal, that has as its main task bringing behavior in line with cultural requirements. Schooling is the specific process of teaching and learning that takes place outside the home. As individuals incorporate others' ideas and mores, beliefs are created and fostered and generally endure, unaltered, unless they are deliberately challenged (Lasley, 1980).

Nisbett and Ross (1980) suggested that all people are theorists about their social and natural world and that information encountered early is the raw material from which they create the inferences they make about themselves, their surroundings, and their circumstances. A primacy effect is at work as these early inferences bias interpretations of subsequent and often contradictory information, so that personal theories are always insufficiently revised even in the face of contradictions this new information may hold. Early experiences strongly influence final judgments, which become theories (beliefs) highly resistant to change. The results are the perseverance phenomena of theory maintenance.

Due to these phenomena, the earlier a belief is incorporated into the belief structure, the more difficult it is to alter, for these beliefs subsequently affect perception and strongly influence the processing of new information. It is for this reason that newly acquired beliefs are most vulnerable. With time and use, they become robust, and individuals hold on to beliefs based on incorrect or incomplete knowledge even after scientifically correct explanations are presented to them. The power of beliefs easily can outweigh the clearest and most convincing contrary evidence (Munby, 1982). People are often loath to engage in discussions that touch on what they feel are their most deeply held beliefs (never argue politics or religion), but, when they do, they usually manage to survive the ordeal with preconceptions comfortably intact.

According to Nisbett and Ross (1980), the perseverance phenomena involve some very agile mental somersaults. First, individuals tend to turn conflicting evidence into support for already held beliefs, using whatever cognitive tricks are necessary, even when their evidence base is totally discredited. It is not simply the emotional qualities of beliefs that are responsible for this. Cognitive and information-processing principles are involved (see Nespors, 1987), and the effect of prior beliefs on memory and interpretation is the result of these principles at work. Individuals use encoding and decoding biases to confirm prior theories when they selectively retrieve material from memory. In other words, beliefs color not only what individuals recall but how they recall it, if necessary completely distorting the event recalled in order to sustain the belief. Once beliefs are formed, individuals have a tendency to build causal explanations surrounding the aspects of those beliefs, whether these explanations are accurate or mere invention. Finally, there is the self-fulfilling prophecy—beliefs influence perceptions that influence behaviors that are consistent with, and that reinforce, the original beliefs.

Nisbett and Ross (1980) concluded that there is substantial evidence to suggest that beliefs persist even when they are no longer accurate representations of reality, and they could find no literature showing that individuals pursue, even in minor ways, strategies that aid in the alteration or rejection of unreasonable or inaccurate beliefs. This is not to say that beliefs do not change under any circumstance but that they generally do not change even when it is logical or necessary for them to do so. Small wonder that beliefs have been avoided by all but the most resolute investigators and have been relegated to the domains of philosophy or mysticism.

This apparently rigid structure, however, is important in helping people to understand themselves and others and to adapt to the world and their place in it. Unyielding as beliefs may be, they provide personal meaning and assist in defining relevancy. They help individuals to identify with one another and form groups and social

systems. On a social and cultural level, they provide elements of structure, order, direction, and shared values. From both a personal and socio/cultural perspective, belief systems reduce dissonance and confusion, even when dissonance is logically justified by the inconsistent beliefs one holds. This is one reason why they acquire emotional dimensions and resist change. People grow comfortable with their beliefs, and these beliefs become their “self,” so that individuals come to be identified and understood by the very nature of the beliefs, the habits, they own. Pogo’s injunction that “We have met the enemy, and he is us” may well be a plea for reflection on the network of inconsistent and unexplored beliefs that often give rise to perplexing behavior.

Peterman (1991) suggested that, if beliefs are mental representations integrated into existing schemata, three assumptions must follow: Beliefs form a schema-like semantic network, contradictory beliefs reside in different domains of that network, and some beliefs may be “core” and difficult to change. She drew support for this conceptualization from Abelson (1979), Sigel (1985), and Nisbett and Ross (1980), but its psychological and philosophical underpinnings can be traced to the work of Milton Rokeach (1960, 1968).

Rokeach—The Belief System

Rokeach (1968) defined a belief system “as having represented within it, in some organized psychological but not necessarily logical form, each and every one of a person’s countless beliefs about physical and social reality” (p. 2). His analysis included three assumptions: Beliefs differ in intensity and power; beliefs vary along a central-peripheral dimension; and, the more central a belief, the more it will resist change. He likened a belief structure to that of an atom, its nucleus holding together the various particles in a stable system. Some beliefs form the nucleus of the system in this central-peripheral dimension, and these central beliefs are more important and resistant to change.

Rokeach (1968) defined centrality in terms of “connectedness: the more a given belief is functionally connected or in communication with other beliefs, the more implications and consequences it has for other beliefs and, therefore, the more central the belief” (p. 5). He proposed four assumptions for connectedness that form a set of priorities for the perceived importance of a belief. Beliefs touching on an individual’s identity or self are more connected, as are beliefs one shares with others. Derived beliefs are learned from others; underived beliefs are learned by direct encounter with the belief object. Underived beliefs have more functional connections, partly because the “I saw it with my own eyes” phenomenon is existential and connected to one’s sense of self. Finally, there are beliefs about matters of taste, and these are arbitrary, less central, and have fewer connections.

Belief substructures (attitudes, values) are part of this belief network, or web, and can also be thought of as connected to central or peripheral strands of that web. Their strength may be interpreted by their functional connections to other beliefs and structures, and this connectedness permits one to infer their importance and predisposition to action. In all, it is a conceptual model with a very simple premise: Human beings have differing beliefs of differing intensity and complex connections that determine their importance.

Schutz (1970) described beliefs as often contradictory, only partially clear, and even incoherent. An individual

may consider statements as equally valid which in fact are incompatible with one another . . . this inconsistency does not necessarily originate in a logical fallacy. Men's thought is just spread over subject matters located within different and differently relevant levels, and they are not aware of the modifications they would have to make in passing from one level to another. (p. 76)

Rokeach (1968) suggested that efforts to determine and understand functional connections along the four dimensions help determine the centrality of individual beliefs or attitudes. These efforts are akin to navigating among relevant levels for the purpose of discovering the relevant structure responsible for housing the belief-laden values that trigger specific behaviors. Inconsistencies are then seen in clearer perspective.

The novel *Goodbye, Mr. Chips* illustrates (see Hilton, 1934). Chippings was a teacher of Latin in an English private school for boys. A kind and gentle man, he loved his students and was committed to their welfare, but he was not a popular teacher, for his classroom demeanor was stern and authoritarian. The educational beliefs of this humanistic educator might appear inconsistent and contradictory, even incoherent. When viewed in the context of connectedness, however, it is likely that Chippings' belief structure was stable and harmonious. His strict attitude was based on the belief that the development of a young man's character required toughness and discipline, and this was of greater concern to him than his desire to show the tenderness and affection he felt. The headmaster and school policy also required such an attitude, and Chippings believed obedience to school and superiors more important than personal philosophy. Along the continuum, each belief can be seen in terms of its connection to more central beliefs within the structure, to differently relevant levels. All individuals, at some point in their lives, suffer attacks of cognitive (belief?) dissonance, where incompatible beliefs are suddenly thrust on them and they must behave in a manner consistent with only one of these beliefs. It is at this point that connections are discovered or created and the centrality of a belief comes to prominence.

As noted earlier, clusters of beliefs around a particular object or situation form attitudes that become action agendas. Beliefs within attitudes have connections to one another and to other beliefs in other attitudes, so that a teacher's attitude about a particular educational issue may include beliefs connected to attitudes about the nature of society, the community, race, and even family. These connections create the values that guide one's life, develop and maintain other attitudes, interpret information, and determine behavior. Bingham, Haubrich, White, and Zipp (1990) discovered that, of the White teachers who rated their own desegregated school highly, 40% did not want their children attending it. The authors suggested that the racial attitudes of White teachers played important roles in their decision of which schools to send their own children to, even when they had very positive attitudes about their own schools. It is, then, this context-specific nature of beliefs and their connections to other beliefs that make them especially difficult to infer and measure. It is this same feature that often makes them appear more inconsistent than they perhaps are.

More Recent Conceptions

Although Rokeach's (1968) conceptualization of belief systems and their origins is useful and holds valuable implications for the understanding of educational beliefs, there are other conceptions of belief. Lewis (1990), for example, contended that there are only six ways individuals can believe or know: believing an authority, deductive logic, the experience of the senses, the emotion of feeling that something is true or right, rational intuition, and personal use of the scientific method. Lewis suggested that, although individuals acquire beliefs through all six modes, one of them ultimately surfaces as the primary mode of developing personal values.

Kitchener (1986) attempted to identify how individuals develop beliefs about knowledge or *forms of epistemic cognition*, defined as "the cognitive processes an individual invokes to monitor the epistemic nature of problems and the truth value of alternative solutions" (p. 76). Her reflective judgment model has its philosophical underpinnings in Dewey's (1933) process of reflection and describes how individuals verify and justify beliefs. Kitchener (1983) argued that these epistemological beliefs develop in a sequence of seven qualitatively different stages, each "characterized by a logically related network of assumptions about knowledge and reality" (p. 80). Note the similarity to Rokeach (1968) in Kitchener's (1986) description of the epistemic belief structure as "a loosely related network of assumptions, some of which are more closely associated than are others" (p. 83). The model is descriptive, however, and does not deal with the nature of beliefs, how they are formed, or how they may be changed.

Posner, Strike, Hewson, and Gertzog (1982) studied college students' conceptions of the scientific theories of special relativity and developed a model of conceptual change to explain how concepts may be altered. They suggested that individuals possess a conceptual ecology that includes anomalies, analogies and metaphors, epistemological commitments, metaphysical beliefs and concepts, and other knowledge. Because metaphysical beliefs and concepts are central to a conception and filter new information before knowledge is acquired, it is reasonable to discuss the model by replacing the word *conception* with that of *belief*, understanding nonetheless that conception, as described by Posner et al., is a broader construct.

According to Posner et al. (1982), the patterns of conceptual change are analogous to Kuhn's (1970) process of paradigm change during a scientific revolution, and they used Piaget's concepts of assimilation and accommodation to describe how new phenomena are dealt with. *Assimilation* is the process whereby new information is incorporated into existing beliefs in the ecology; *accommodation* takes place when new information is such that it cannot be assimilated and existing beliefs must be replaced or reorganized. Both result in belief change, but accommodation requires a more radical alteration. When metaphysical and epistemological beliefs are deep and strong, an individual is more likely to assimilate new information than to accommodate it. Posner et al. suggested that individuals must be dissatisfied with existing beliefs and that new beliefs must be intelligible and appear plausible before most accommodation can take place. Moreover, new beliefs must be consistent with other conceptions in the ecology. Rokeach (1968) would suggest that they must have functional connections to other beliefs in the structure. Learning and inquiry are dependent on prior beliefs that not only make current phenomena intelligible but also organize and define new information.

Beliefs are unlikely to be replaced unless they prove unsatisfactory, and they are unlikely to prove unsatisfactory unless they are challenged and one is unable to assimilate them into existing conceptions. When this happens, an anomaly occurs—something that should have been assimilable is resisted. Even then, belief change is the last alternative. Posner et al. (1982) found that students in their study rejected new information, considered it irrelevant, compartmentalized their conceptions to prevent it from conflicting with existing beliefs, or even forcefully assimilated it in the face of conflicting logic, reason, and observation before they would consider accommodation.

A number of conditions must exist before students find anomalies uncomfortable enough to accommodate the conflicting information. First, they must understand that new information represents an anomaly. Second, they must believe that the information should be reconciled with existing beliefs. Third, they must want to reduce the inconsistencies among the beliefs. And last, efforts at assimilation must be perceived as unsuccessful. No small wonder, they argued, that conceptions are seldom weakened by anomalies. Students are generally unaware of their anomalies. In addition, if and when conceptual change takes place, newly acquired beliefs must be tested and found effective, or they risk being discarded.

This is consistent with Guskey's (1986) findings that staff development programs are usually unsuccessful in bringing about attitude and belief change, but, when teachers can be talked into using a procedure and find it successful in improving student achievement, tremendous attitude change often is reported. This change, however, does not materialize when teachers do not use the technique or, more importantly, when they use it but notice no improvement in their students. This led Guskey to conclude that change in beliefs follows, rather than precedes, change in behavior.

Schommer (1990) conducted two experiments to explore students' beliefs about the nature of knowledge and their effect on comprehension and concluded that epistemological beliefs affected the students' critical interpretation of knowledge, their information processing strategies, and their efforts at comprehension monitoring. A belief, she found, will distort information so as to remain self-consistent, a finding in keeping with the perseverance phenomena.

Nespor (1987), drawing from Abelson (1979), described beliefs as *framing* or defining tasks, prescribed a view of cognitive processing necessary to understand this function, and identified four levels of thought: internal processing, resources, control (or metacognitive processes), and beliefs. Internal processing includes unconscious and automatized perception—what Nespor calls the nuts and bolts of cognition. It is analogous to Dewey's (1933) first meaning of thought. The knowledge structures that an individual brings to the task are resources, and these include facts, algorithms, local heuristics, or whatever is available. These resources aid in assessing relevancy and applying knowledge to the problem at hand, and Nespor referred to them as the tactics. Control provides the cognitive strategy that will be used on the problem or task.

Nespor (1987) argued that individuals use strategic thought to select the cognitive tools with which to solve a problem, and this is where beliefs play the important role of determining the task to be performed or defining the problem. The progression from one level to another involves increasingly encompassing thought systems, but the tasks and problems are defined by beliefs. The affective components of beliefs

noted earlier facilitate their storage in long-term memory and become gestalts that are efficiently represented and retrieved and acquire a signature feeling. This signature feeling serves three functions: It facilitates recall by improving access to memory files due to the coloration of the feeling, it acts as the glue that holds elements of memory together for long periods (perhaps indefinitely), and it serves a constructive and reconstructive memory function by filling in incomplete memory gaps during recall and/or filtering information that conflicts with the signature feeling. Ultimately, this information-processing model of belief prominence depends on the affective/episodic/emotional nature of beliefs, and it is the role that emotion and affect play in memory indexing and retrieval that Nespor has claimed holds the greatest potential for research on beliefs.

Brown and Cooney (1982) also suggested that beliefs have their roots in Herskovits's model of cultural transmission and argued that understanding the nature of the model, and belief systems in general, will help understanding how teachers internalize and practice what they learn in teacher education. Lortie (1975) lamented that the thousands of hours teachers spend in the classroom as students far outweigh the effects of this education. Rokeach (1968) would not be surprised by this lament, for those hours are fertile ground for developing beliefs of all types. Students bring them to teacher education; teachers take them into their schools and classrooms.

It is for these reasons that investigating the educational beliefs of teachers and teacher candidates should become a focus of current educational research, and it is also for these reasons that teacher preparation programs can ill afford to ignore the entering beliefs of preservice teachers. A brief detour through this important area helps explain why Fenstermacher (1979) and Pintrich (1990) urged researchers to make beliefs such a focus.

The Beliefs of Preservice Teachers

One's personal predispositions are not only relevant but, in fact, stand at the core of becoming a teacher.

—Dan Lortie, *Schoolteacher*

Van Fleet (1979) wrote of visiting his brother's home and finding his 8-year-old niece playing "teacher." She was in her room, surrounded by her dolls and poised by her very own blackboard,

standing there with the chalk balanced perfectly in her fingers, and with the right tone of voice and facial expression, she was teaching, urging her doll students to pay close attention during this important lesson. She had "teacher" down pat. (p. 283)

Little Miss Van Fleet was well into developing a set of beliefs and practices related to being a teacher. Whatever sort of person she might grow up to be, for at least the next 10 years she would hone those practices and strengthen her budding, if not already entrenched, beliefs.

These beliefs about teaching are well established by the time students get to college (Buchmann, 1987; Florio-Ruane & Lensmire, 1990; Wilson, 1990). They are developed during what Lortie (1975) called the apprenticeship of observation that takes place during the many years students spend at school. They include ideas about what it takes to be an effective teacher and how students ought to behave, and, though usually unarticulated and simplified, they are brought into teacher preparation programs (Clark, 1988; Nespor, 1987).

Florio-Ruane and Lensmire (1990) cautioned that some of these beliefs are compatible with the educational hopes that teacher educators have for preservice teachers but some are not. In addition, research has produced unsettling findings. For example, most preservice teachers have an unrealistic optimism and a self-serving bias that account for their believing that the attributes most important for successful teaching are the ones they perceive as their own. They believe that problems faced by classroom teachers will not be faced by them, and the vast majority predicts they will be better teachers than their peers. Entering teacher candidates view teaching as a process of transmitting knowledge and of dispensing information (see Brookhart & Freeman's review, 1992). They also emphasize and overvalue affective variables and undervalue cognitive/academic variables (Porter & Freeman, 1986; Weinstein, 1988). Some of their beliefs have been called insidious, even dysfunctional (Wilson, 1990).

Insiders in a Strange Land

When most students enter their academic disciplines, they are unlikely to have well-developed theories and preconceptions about their field of study (Posner et al., 1982). Schutz (1970) argued that the confidence of strangers in the validity of their thinking as usual is first shaken by finding their surroundings quite different than expected. Medical students must enter operating theaters and emergency rooms; law students encounter courtrooms and law offices. These places are new to students, what goes on in them is alien, and understandings must be constructed nearly from scratch. They must "define" their new surroundings and recreate their world. Accommodating new information and developing new beliefs are thus gradual enterprises of taking initial steps, accepting and rejecting certain ideas, modifying existing belief systems, and finally adopting new beliefs. For these strangers, the process involves minimal conflict or threat, for they have slight allegiance to prior expectations or ties to former practices and habits.

Preservice teachers are insiders. They need not redefine their situation. The classrooms of colleges of education, and the people and practices in them, differ little from classrooms and people they have known for years. Thus, the reality of their everyday lives may continue largely unaffected by higher education, as may their beliefs. For insiders, changing conceptions is taxing and potentially threatening. These students have commitments to prior beliefs, and efforts to accommodate new information and adjust existing beliefs can be nearly impossible.

Ginsburg and Newman (1985) worried about the part this familiarity plays in the political process of reproducing society. Most students who choose education as a career have had a positive identification with teaching, and this leads to continuity of conventional practice and reaffirmation, rather than challenge, of the past (Lortie, 1975). It does not occur to most preservice teachers, for example, that one of their future functions might be, should be, as agents for societal change (Edmundson, 1990). Students become teachers unable, and subconsciously unwilling, to affect a system in need of reform.

Indeed, if preservice teachers enter programs treating political and economic inequalities as natural or unproblematic (and if they are not successfully encouraged to critically examine these issues during their program), we may have part of the explanation for the tendency among teachers to function as professional ideologists, i.e., apologists for at least preservers of the status quo. (Ginsburg & Newman, 1985, p. 49)

When anthropologists have studied these early experiences, they have found them powerful in affecting behavior that becomes highly resistant to change in adult life (Van Fleet, 1979). Beliefs developed as students reflect what Florio-Ruane and Lensmire (1990) called status quo rather than state-of-the art, practice. Episodic memories and constructions of times in the past result in inappropriate representations and reconstructions in the present. Evaluations of teaching and teachers that individuals make as children survive nearly intact into adulthood and become stable judgments that do not change, even as teacher candidates grow into competent professionals, able, in other contexts, to make more sophisticated and informed judgments. Rather, they are left with the view that "what constituted good teaching then constitutes it now" (Lortie, 1975, p. 66).

Goodman (1988) reported that preservice teachers express their educational philosophy in verbal terms, but the perspectives on which these philosophies are based are rooted in visual guiding images from earlier experiences as pupils (see Calderhead & Robson, 1991; Eraut, 1985). These images help teachers make sense of new information but also act as filters and intuitive screens through which new information and perceptions are sifted. Buchmann and Schwille (1983) warned that these vivid experiences and images can be irrelevant for purposes of developing professional judgment and argued that individuals should often be protected from the effects of early experience, for it has no monopoly on truth, reason, or subsequent reality.

Although teacher education researchers are aware of the power of this early enculturation in developing educational beliefs, they have failed to explore it. The resistant-to-change nature of educational beliefs, however, is a recurring theme (Brown & Cooney, 1982; Buchmann, 1984, 1987; Buchmann & Schwille, 1983; Clark, 1988; Hollingsworth, 1989; Lasley, 1980; Lortie, 1975; O'Loughlin & Campbell, 1988; Wilson, 1990).

Synthesis of Findings on Beliefs

People regulate their level and distribution of effort in accordance with the effects they expect their actions to have. As a result, their behavior is better predicted from their beliefs than from the actual consequences of their actions.

—Albert Bandura, *Social Foundations of Thought and Action*

What is one to make of belief, then? Sifting clarity from the complexity of any psychological construct is seldom easy, but researchers have expressed confidence in a number of findings, and some inferences and generalizations can be made with reasonable confidence. They are offered below not as a compendium of categorical truths but as fundamental assumptions that may reasonably be made when initiating a study of teachers' educational beliefs.

1. Beliefs are formed early and tend to self-perpetuate, persevering even against contradictions caused by reason, time, schooling, or experience (Abelson, 1979; Buchmann, 1984, 1987; Buchmann & Schwille, 1983; Clark, 1988; Florio-Ruane & Lensmire, 1990; Ginsburg & Newman, 1985; Lasley, 1980; Lortie, 1975; Munby, 1982; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982; Rokeach, 1968; Schommer, 1990; Van Fleet, 1979; Wilson, 1990).

2. Individuals develop a belief system that houses all the beliefs acquired through the process of cultural transmission (Abelson, 1979; Brown & Cooney, 1982; Eisenhart et al., 1988; Nisbett & Ross, 1980; Peterman, 1991; Posner et al., 1982; Rokeach, 1968; Van Fleet, 1979).

3. The belief system has an adaptive function in helping individuals define and understand the world and themselves (Abelson, 1979; Lewis, 1990; Nisbett & Ross, 1980; Rokeach, 1968; Schutz, 1970).

4. Knowledge and beliefs are inextricably intertwined, but the potent affective, evaluative, and episodic nature of beliefs makes them a filter through which new phenomena are interpreted (Abelson, 1979; Calderhead & Robson, 1991; Eraut, 1985; Goodman, 1988; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982; Schommer, 1990).

5. Thought processes may well be precursors to and creators of belief, but the filtering effect of belief structures ultimately screens, redefines, distorts, or reshapes subsequent thinking and information processing (Abelson, 1979; Calderhead & Robson, 1991; Goodman, 1988; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982; Rokeach, 1968; Schommer, 1990).

6. Epistemological beliefs play a key role in knowledge interpretation and cognitive monitoring (Anderson, 1985; Kitchener, 1986; Nespor, 1987; Nisbett & Ross, 1980; Peterman, 1991; Posner et al., 1982; Schommer, 1990).

7. Beliefs are prioritized according to their connections or relationship to other beliefs or other cognitive and affective structures. Apparent inconsistencies may be explained by exploring the functional connections and centrality of the beliefs (Kitchener, 1986; Nespor, 1987; Peterman, 1991; Posner et al., 1982; Rokeach, 1968; Schutz, 1970).

8. Belief substructures, such as educational beliefs, must be understood in terms of their connections not only to each other but also to other, perhaps more central, beliefs in the system (Kitchener, 1986; Peterman, 1991; Posner et al., 1982; Rokeach, 1968). Psychologists usually refer to these substructures as attitudes and values.

9. By their very nature and origin, some beliefs are more incontrovertible than others (Abelson, 1979; Bandura, 1986; Clark, 1988; Lewis, 1990; Lortie, 1975; Nisbett & Ross, 1980; Rokeach, 1968).

10. The earlier a belief is incorporated into the belief structure, the more difficult it is to alter. Newly acquired beliefs are most vulnerable to change (Abelson, 1979; Clark, 1988; Lewis, 1990; Munby, 1982; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982; Rokeach, 1968).

11. Belief change during adulthood is a relatively rare phenomenon, the most common cause being a conversion from one authority to another or a gestalt shift. Individuals tend to hold on to beliefs based on incorrect or incomplete knowledge, even after scientifically correct explanations are presented to them (Abelson, 1979; Lewis, 1990; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982; Rokeach, 1968).

12. Beliefs are instrumental in defining tasks and selecting the cognitive tools with which to interpret, plan, and make decisions regarding such tasks; hence, they play a critical role in defining behavior and organizing knowledge and information (Abelson, 1979; Bandura, 1986; Lewis, 1990; Nespor, 1987; Nisbett & Ross, 1980; Posner et al., 1982; Rokeach, 1968; Schommer, 1990).

13. Beliefs strongly influence perception, but they can be an unreliable guide to the nature of reality (Abelson, 1979; Bandura, 1986; Buchmann & Schwille, 1983; Lewis, 1990; Nespor, 1987; Nisbett & Ross, 1980; Rokeach, 1968).

14. Individuals' beliefs strongly affect their behavior (Abelson, 1979; Bandura, 1986; Brown & Cooney, 1982; Clark & Peterson, 1986; Eisenhart et al., 1988; Ernest, 1989; Goodman, 1988; Harvey, 1986; Kitchener, 1986; Lewis, 1990; Nespor, 1987; Nisbett & Ross, 1980; Rokeach, 1968; Tabachnick & Zeichner, 1984).

15. Beliefs must be inferred, and this inference must take into account the congruence among individuals' belief statements, the intentionality to behave in a predisposed manner, and the behavior related to the belief in question (Goodman, 1988; Janesick, 1977; Rokeach, 1968; Tabachnick & Zeichner, 1984).

16. Beliefs about teaching are well established by the time a student gets to college (Abelson, 1979; Buchmann, 1984, 1987; Buchmann & Schwille, 1983; Clark, 1988; Clark & Peterson, 1986; Cole, 1989; Floden, 1985; Florio-Ruane & Lensmire, 1990; Ginsburg & Newman, 1985; Lortie, 1975; Nespor, 1987; Nisbett & Ross, 1980; Rokeach, 1968; Weinstein, 1988, 1989; Wilson, 1990).

Reflections and Research Directions

I have argued that the investigation of teachers' beliefs is a necessary and valuable avenue of educational inquiry. For various reasons, this avenue continues to remain lightly traveled. Researchers who have wandered into it have found exploring the nature of beliefs a rewarding enterprise, and their findings suggest a strong relationship between teachers' educational beliefs and their planning, instructional decisions, and classroom practices, although neither the nature of educational belief acquisition nor the link to student outcomes has yet been explored carefully. However, because researchers have defined beliefs in terms of their own agendas and seldom explored the many possible interactions among belief subconstructs or their connections to other cognitive or affective structures, it has been difficult to develop a clear understanding of this relationship.

Munby's (1982) thorough exploration of the educational beliefs literature led him to suggest that, when studies show a lack of relationship between beliefs and teacher behaviors and decisions, either the instrument or the model was poorly chosen. In either case, the problem lies in understanding which beliefs influence these decisions. When beliefs about a particularly subject area are inconsistent with a teacher's practice in that area, it may just be that "different and weightier" (p. 216) beliefs are the cause, a view consistent with that of researchers who have investigated belief structures.

I have also suggested that methodology and design of studies, as well as the measurement of educational beliefs, need careful reconsideration and researchers need agreement on the meaning and conceptualization of belief. Because they are specific enough to be reasonably operationalized and more easily measured, belief subconstructs, such as self-efficacy, lend themselves more readily to educational research. But, because they offer a limited glimpse into a much broader system and because understanding their connections and centrality is essential to understanding the nature of their effect, researchers must study the context-specific effects of beliefs in terms of these connections. Seeing educational beliefs as detached from and unconnected to a broader belief system, for example, is ill advised and probably unproductive. Bunting (1984) warned that the multidimensionality of beliefs "clearly

points to the risk in attempting to use one educational referent as a basis for predicting positions with regard to another" (p. 198). It is important to think in terms of connections among beliefs instead of in terms of beliefs as independent subsystems and to conceptualize belief models in ways that make research findings clearer and more accurate reflections of their aims and of the construct. When carefully conceptualized, when educational beliefs and their implications are seen against the backdrop of a broader belief structure, inconsistent findings may become clearer and more meaningful.

It is also clear that, if reasonable inferences about beliefs require assessments of what individuals say, intend, and do, then teachers' verbal expressions, predispositions to action, and teaching behaviors must all be included in assessments of beliefs. Not to do so calls into question the validity of the findings and the value of the study. Traditional belief inventories provide limited information with which to make inferences, and it is at this step in the measurement process that understanding the context-specific nature of beliefs becomes critical.

In addition to problems inherent in all self-report instruments, belief inventories cannot encompass the myriad of contexts under which specific beliefs become attitudes or values that give fruition to intention and behavior. Individual items fall prey to "it depends" thinking, and responses fail to provide either accurate or useful inferences of behavior. Munby (1982, 1984) observed that these traditional inventories present teachers with and ask them to respond to lists of beliefs that may or may not correspond to the beliefs relevant to their unique professional reality. This is not to say they should not be used. Results can help detect inconsistencies and areas that merit attention, but additional measures such as open-ended interviews, responses to dilemmas and vignettes, and observation of behavior must be included if richer and more accurate inferences are to be made. Wilson (1990) astutely observed that students' beliefs surface from their behaviors as much as from their answers.

Some researchers claim that qualitative research methodology is relevant, appropriate, and promising in this regard. For example, Schunk (1991) suggested that, although quantitative methods typically have been used in studying efficacy beliefs, qualitative methods, such as case studies or oral histories, are needed to gain additional insights, a recommendation echoed by Brookhart and Freeman (1992) as regards the study of beliefs of entering teacher candidates. Munby (1982, 1984) suggested that qualitative research methodology is especially appropriate to the study of beliefs. The choice of a quantitative or qualitative approach will, of course, ultimately depend on what researchers wish to know and how they wish to know it.

Current interest in metaphor, biography, and narrative as ways to understand the beliefs of teachers and teacher candidates is a promising research direction (see Bullough, 1991; Connelly & Clandinin, 1986; Munby, 1986, 1987). Peterman's (1991) implications for belief change through staff development are equally promising. Continued emphasis on epistemological beliefs and their relationship to knowledge structures and teacher practices also should be encouraged (see Schommer, 1990).

Little will have been accomplished if research into educational beliefs fails to provide insights into the relationship between beliefs, on the one hand, and teacher practices, teacher knowledge, and student outcomes on the other. It is easy to urge teacher educators, for instance, to make educational beliefs a primary focus of their teacher preparation programs, but how are they to do this without research findings

that identify beliefs that are consistent with effective teaching practices and student cognitive and affective growth, beliefs that are inconsistent with such aims, and beliefs that may play no significant role (see Brousseau & Freeman, 1988)? Weinstein (1989) and Wilson (1990) may claim that beliefs of preservice teachers are idealistic, unrealistically optimistic, or insidious and dysfunctional, but it would be useful to explore the effects of these beliefs beyond the preservice experience.

Recent findings also suggest that educational beliefs of preservice teachers play a pivotal role in their acquisition and interpretation of knowledge and subsequent teaching behavior and that unexplored entering beliefs may be responsible for the perpetuation of antiquated and ineffectual teaching practices. But research on the beliefs of preservice teachers is scarce. Investigators are hampered in this area by obvious methodological and design problems. It is difficult, for example, to study beliefs in terms of teacher practices or student outcomes when these are not usually in evidence during teacher education. Such studies require longitudinal designs beyond the means of most researchers and beyond the scope of all but the most patient and determined dissertators. For this reason, nearly all research on beliefs has focused on in-service teachers or the student teaching experience. These findings provide valuable information to teacher educators, but they do not supplant the need for research on the nature and effects of the beliefs of teacher candidates.

There are good reasons why attempting to understand the beliefs of preservice teachers is essential to teacher education. Researchers have demonstrated that beliefs influence knowledge acquisition and interpretation, task definition and selection, interpretation of course content, and comprehension monitoring. Schommer (1990) argued that the study of epistemological beliefs may prove more valuable for understanding comprehension than either metacognition or schema theory, neither of which is able to explain students' failure to integrate information or monitor comprehension. If this is so and their affective and evaluative loading affects the energy that individuals expend on an activity and how they will expend it, research on educational and epistemological beliefs of preservice teachers may help reveal how they interpret and define the goals and curricula of teacher education programs—in essence, how beliefs affect preservice teachers' own cognitive and affective outcomes. Pintrich (1990) reviewed the psychological literature on student learning and college teaching and its implications for teacher education and urged that research studies be undertaken to discover how beliefs influence the learning of preservice teachers in teacher education programs.

Research on the entering beliefs of preservice teachers would provide teacher educators with important information to help determine curricula and program direction. For example, Weinstein's (1988, 1989) findings that preservice teachers overvalue affective student outcomes and undervalue cognitive student outcomes suggest that methods and curricula should be selected to remedy this and help students develop a more balanced view. Narrative and biography can be used to understand how early experiences paint the portraits of "teacher" that students bring with them to teacher education, and these findings can help parents and teachers as they raise and educate youth. Also, if Munby (1986, 1987) is correct that teachers use metaphors to generate, define, and solve a problem and that metaphorical figures can offer insights into teachers' construction of their professional reality, then studying the metaphors of preservice teachers should also prove valuable.

Bandura (1986) argued that self-efficacy beliefs—individuals' judgments of their competence to execute a particular task—are the strongest predictors of human

motivation and behavior. If this is so, preservice teachers' self-efficacy beliefs might shed light on their academic, social, and preprofessional inclinations and choices. For example, Woolfolk and Hoy (1990) discovered that preservice teachers' sense of teacher efficacy was related to their beliefs about controlling students. Other investigators have suggested that efficacy beliefs about specific academic subjects such as reading, writing, and mathematics may be related to strength and level of academic outcomes such as interest, perseverance, and achievement (see Multon, Brown, & Lent, 1991, for meta-analysis). Ashton and Webb (1986) called for an exploration of preservice teachers' conceptions of teacher efficacy to better understand the role these beliefs play in the development of future perspectives and teaching practices.

Research is also needed on the liberal transformation that students are said to undergo during their preservice experience and their return to more conservative orientations (see Veenman, 1984). The socialization of teachers can be little understood outside the context of their shifting conceptions. If research findings on the hardness of beliefs and the difficulty of belief change are correct, it seems unlikely that these shifts are what they appear to be. Research aimed at exploring the connections between broader, personal beliefs and the more context-specific educational beliefs would help explain the nature of this shift.

Ultimately, research is necessary on the nature and process of belief change itself. Teacher educators know that students can undergo what Nespor (1987) called *gestalt shifts*. In a few, this shift survives through the most trying career experiences; in others, it does not last beyond student teaching.

I come full circle now to restate my premise. Attention to the beliefs of teachers and teacher candidates can inform educational practice in ways that prevailing research agendas have not and cannot. The study of beliefs is critical to education precisely because, as Kagan (1992) concluded, "the more one reads studies of teacher belief, the more strongly one suspects that this piebald of personal knowledge lies at the very heart of teaching" (p. 85). If the hesitancy of many researchers to study beliefs and of educators to make them a focus of teaching and teacher preparation has been due to, as one colleague put it to me, the concern that beliefs are "messy" things, I suggest that the construct is less messy, far cleaner, and conceptually clearer than it may appear. When they are clearly conceptualized, when their key assumptions are examined, when precise meanings are consistently understood and adhered to, and when specific belief constructs are properly assessed and investigated, beliefs can be, as Fenstermacher (1979) predicted, the single most important construct in educational research.

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